

CLAIMS:

1. A rubber grinding apparatus for generating ground rubber particles from rubber material, comprising:

a rotatable grinding wheel;

a feeder for advancing rubber material against said grinding wheel;

a shroud enclosing said grinding wheel, said shroud having an aperture for directing ground rubber particles away from said grinding wheel during rotation thereof;

and

a cooler in thermal contact with said grinding wheel for cooling thereof

2. A rubber grinding apparatus according to claim 1 further including:

a mover adjacent said aperture for conveying rubber particles away from said grinding wheel; and

a separator adjacent to said conveyor for separating rubber particles based on size.

3. A rubber grinding apparatus according to claim 2 wherein said mover includes a conveyor belt.

4. A rubber grinding apparatus according to claim 2 wherein said mover includes an auger.

5. A rubber grinding apparatus according to claim 2 wherein said separator includes a vacuum system for processing airborne rubber dust particles.

6. A rubber grinding apparatus according to claim 5 wherein said vacuum system is a cyclone system.

7. A rubber grinding apparatus according to claim 1 wherein said feeder includes a feed tube.

8. A rubber grinding apparatus according to claim 7 wherein said feed tube includes a plunger for forcing rubber material against said grinding wheel.

9. A rubber grinding apparatus according to claim 8 wherein said plunger is pneumatically movable toward said grinding wheel.

10. A rubber grinding apparatus according to claim 7 wherein said feed tube includes an auger for forcing rubber material against said grinding wheel.

11. A rubber grinding apparatus according to claim 1 wherein said cooler is liquid-cooled.

12. A rubber grinding apparatus according to claim 11 wherein said cooler comprises a liquid-filled cavity.

13. A rubber grinding apparatus according to claim 12 wherein said cooler includes at least one liquid inlet and at least one liquid outlet to allow circulation of liquid into and out of said cooler.

14. A rubber grinding apparatus according to claim 1 wherein said cooler is physically connected to said shroud.

15. A rubber grinding apparatus according to claim 2 wherein said separator includes a screen module.

16. A rubber grinding apparatus according to claim 15 wherein said screen module includes at least two screens of different mesh sizes.

17. A rubber grinding apparatus according to claim 16 wherein said screen module separately outputs rubber particles passing through two screens from rubber particles passing through one screen.

18. A grinding module including;

a grinding wheel;

a shroud surrounding said grinding wheel; and

a cooling jacket thermally coupled to said shroud for cooling said grinding wheel.

19. The rubber grinding apparatus of claim 18 wherein said cooling jacket is liquid-cooled.

20. The rubber grinding apparatus of claim 18 wherein said cooling jacket comprises a liquid-filled cavity.

21. The rubber grinding apparatus of claim 20 wherein said cooling jacket includes at least one liquid inlet and at least one liquid outlet to allow circulation of liquid.

22. A method for grinding recyclable products comprising the steps of:  
advancing recyclable material onto a grinding wheel;  
grinding said recyclable material with a grinding wheel to produce recyclable particles; and  
cooling said grinding wheel using a cooling jacket.

23. The method of claim 22 wherein said advancing step includes advancing recyclable material using a plunger.

24. The method of claim 22 wherein said advancing step includes advancing recyclable material using an auger.

25. The method of claim 22 wherein said cooling step includes cooling using a liquid-cooled cooling jacket.

26. The method of claim 22 wherein said cooling step includes cooling using a cooling jacket including at least one liquid inlet and at least one liquid outlet to allow circulation of liquid within the cooling jacket.

27. A method for recycling rubber material using a grinding wheel comprising the step of:

advancing rubber material against a grinding wheel;  
grinding said rubber material into rubber particles;  
cooling said grinding wheel;  
conveying said rubber particles away from said grinding wheel; and  
separating said rubber particles based on size.

28. The method of claim 27 wherein said cooling step includes cooling using a liquid-cooled cooling jacket.

29. The method of claim 27 wherein said cooling step includes cooling using a cooling jacket including at least one liquid inlet and at least one liquid outlet to allow circulation of liquid within the cooling jacket.

30. The method of claim 27 wherein said screening step includes screening rubber particles based on size using at least two screens.

31. The method of claim 27 further including the step of processing airborne rubber particles using a vacuum system.

32. A method for producing commercially usable rubber particles from used rubber material comprising:

substantially powderizing used rubber material, said powderizing taking place at substantially ambient temperatures.